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Virginia Wildlife

**Dedicated to the Conservation of
Virginia's Wildlife and Related Natural Resources
and to the Betterment of
Outdoor Recreation in Virginia**

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Erosion of a Right

The right of each person to do as he pleased within very broad guidelines for the good of the population as a whole was one of the strong forces that motivated the founding fathers of our country. From Appalachian mountaineers to western cattle barons the right to build one's own empire or "do your own thing," in the lingo of the mod generation, has been cherished. Outdoors buffs are probably the least domesticated of our current populace and they have cherished this privilege as though it were a constitutional right.

One of the hardest things for an outdoorsman to accept, as the outdoors shrinks and our population grows, is the regimentation and regulation that follow. The privilege of hunting on private property or fishing a private stream, the privilege of pulling off the road in a nice spot and setting up camp, of parking one's car in a convenient spot and taking a hike through the woods are all becoming increasingly difficult to exercise. As these unorthodox outdoorsmen descend in mass on favorite camping spots, the Health Department steps in with regulations prohibiting such unsanitary gatherings until facilities are developed which equal the deluxe private campgrounds these people came here to avoid. The Game Commission had to close two such areas in the past year because the demand was greater than facilities could support. The state police have been forced to have cars towed when 70 or more carloads of backpackers descend on Old Rag Mountain in a single weekend, blocking public roads and private drives. The Game Commission has had similar experiences when hunters' cars exceeded the capacity of parking lots. Landowners, over whose property the Appalachian trail has passed for years, finally say "no, thanks" to the hordes of hikers and other assorted types clamoring over their property. It has been said that on some of our rivers during the height of the recreational season a canoe or johnboat passes every minute. Sheer masses of humanity flocking to the outdoors trigger more and more rules and regulations and further restrict the individual person's freedoms of choice. We have not yet been forced to limit the number of hunters on our management areas or assign hunting territories, but other states have.

It is as though we started out wandering on a broad plain but are gradually being hemmed in by converging canyon walls until we will soon all be marching in unison down a tunnel. Since control of people is better when they are concentrated in large numbers in places where there are extensive facilities, the trend seems to be in this direction. This creates crowds, noise, and personal encounters that most of us go to the outdoors to avoid. A hike down the Appalachian trail with a park ranger in the rear calling cadence is an outdoor experience most of us would gladly pass up. The rapid erosion of our privilege to enjoy the outdoors as we please is what makes most outdoorsmen cringe at thoughts of further expansion of the outdoor recreation boom and recreational development in the outdoors.—H.L.G.

LETTERS

Giving Hook Swallowers the Barb

I am aware that possession of a bass under legal size is grounds for a fine. I assume, however, that if the hook is so swallowed by the fish that it cannot be retrieved without mortally wounding the fish, that one can legally possess the fish. It seems quite wasteful to release such a fish only to have it flounder about "belly-side up."

John Hickerson
Berryville

THERE is no legal provision for keeping an undersized bass in Virginia, even though it has swallowed the hook. In such cases one must try to cut the leader as short as possible to cause as little interference with the fish's food intake as possible. Fish have been known to live long lives with hooks in them, but most rust away quickly.

John McLaughlin
Chief, Law Enforcement Div.

Paint Can Controversy

I have a suggestion for Mr. Dale Thompson, "Eight Points and a Back Pack," November, 1973 issue, to reduce the weight of his back pack—leave his small can of white spray paint at home! I also wonder if Mr. Thompson might not be "appalled" at the sight of Virginia's woodlands were every hunter to follow his up-dated version of Hansel and Gretel finding their way.

Raymond J. Kordish
New York City

Some of Virginia's tree farmers informed us they were horrified at the prospect of 200,000 hunters armed with spray paint roaming their properties since they use paint to mark boundaries, timber sales, diseased trees, etc. Although it may not have made much difference in the remote section where Mr. Thompson used it, it could certainly lead to trouble and bad feelings between hunters and landowners elsewhere.—Ed.

Supports License Hike

I read with great interest your November editorial outlining the proposed license fee increases.

In view of the inflationary trend our state has experienced over the last 24 years, I personally feel the Game Commission has done an outstanding job maintaining and expanding its programs and that the proposed increases are not exorbitant. However, I do not believe that the majority of our uninformed public will concur.

Numerous sportsmen in my area, my family, and myself fully support any proposal or resolution which will help us retain our lands, resources, and wildlife for posterity.

D. M. Campbell
Waynesboro



Spawning migrations often carry fishes from their home waters to headwater streams.

WHICH WAY HOME?

By FRANKLIN B. TITLOW
and ROBERT T. LACKEY

CAN a salmon *smell* his homestream while traveling thousands of miles away from land? Do large-mouth bass *see* their way across a lake? Are schools of cod able to maintain a yearly migrational pattern by *drifting* with ocean currents? These and many other questions about migrating fishes have puzzled fisheries scientists for many years.

Migration is characteristic of many fish species. Perhaps the best known examples are those of the salmon. Pink salmon from southeastern Alaska and British Columbia have been known to travel over 4,000 miles per year. Chinook salmon cover even greater distances while returning to the Columbia River from south of the Aleutian Islands.

One of the longest distances traveled by a single fish was recorded for a tagged bluefin tuna which traveled from Cat Cay (Bahamas) to the Norwegian coast, a distance of over 5,000 miles. Other extensive travelers include albacore, white marlin, swordfish, sailfish, tuna, eels, and dogfish.

Many freshwater fishes also demonstrate migratory behavior. Extensive studies on white bass, largemouth bass, rainbow trout, cutthroat trout, and bluegill have been made to learn *how* fish find their way.

Theories as to the direction-finding mechanism employed by fishes include: (1) passive drift, (2) random search, (3) sun orientation, (4) odor orientation, (5) orientation to visual landmarks, (6) orientation to electrical fields, (7) orientation to water currents, and (8) orientation to physical and chemical gradients. Evidence has been found to both support and cast doubt on each of these theories.

Can fishes migrate simply by *drifting* with currents? Migrational patterns—from spawning grounds to rearing areas to feeding grounds—of herring in the North Sea appear to be controlled by ocean currents. The seasonal direction of movement of herring parallels the prevailing current direction in each locality. However, the passive drift theory fails to explain salmon migrational speeds of over thirty miles per day in the North Pacific Ocean. Current velocities in the North Pacific average only 1-4 miles per day. Also, upstream migration cannot possibly be the result of passive drift.

Do fishes find their way by searching for their destination in a *random* fashion? Tagged largemouth bass have been observed to move at random when released in the center of a lake. Recaptures indicated that over fifty percent of these tagged bass returned to the area of original capture. In similar studies, over ninety-five percent of the tagged brown and cutthroat trout used returned to their home stream. It is doubtful that random search procedures alone could account for extremely high homing percentages.

Can fishes use the *sun* to guide them? Both field and laboratory studies have provided evidence that fish can use the sun for direction finding. The theory is that fish possess an internal compass-like mechanism which is controlled by the position of the sun. However, migrational movements of fish have been observed at night and on extremely overcast days. Sun orientation fails to explain fish migration during periods when the sun is not visible.

Can fishes *smell* their home area? This theory proposes that each home area possesses a unique odor which fish learn in the early weeks of life. Adult fish

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use this learned odor to guide their return to the home area. Research has shown that many fish do rely on their sense of smell to detect their home area, but experiments with cutthroat trout provide evidence against the absolute necessity of smell in homing. In these studies, trout with nose plugs were able to home as successfully as trout without nose plugs.

Do fishes follow a series of *visual* landmarks during migration? Several studies in Yellowstone Lake, Wyoming, suggest that cutthroat trout are able to follow the lake shoreline to the entrance of their home stream, but experimentally blinded cutthroat trout were able to find their home stream as easily as normal trout.

Can fishes detect and follow differences in *electrical voltage* in the aquatic environment? Water is an electrical conductor which produces voltages by moving through the earth's magnetic field. Sturgeon swimming in the Snake River in Idaho avoid passing directly under a high voltage power line. Sharks and rays can detect weak electrical stimuli in the ocean, but most migrating fishes do not possess electrical sensory devices, which would allow orientation to electrical fields.

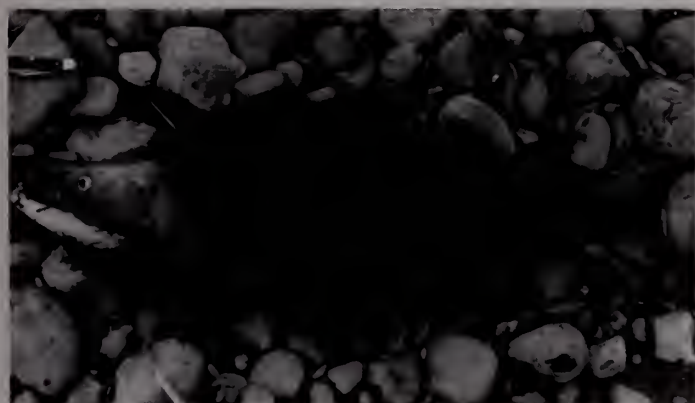
Can fishes follow the *boundaries* of currents in a body of water? The migrational patterns of some oceanic fishes are probably governed by currents, but direct detection of current boundaries by migrating fish seems unlikely because of the immense volume of water that would have to be traversed.

Are fishes able to detect and follow physical and chemical *gradients*? Slight variations in the amount of dissolved gases, solids, acidity, and temperature exist within any body of water. However, the differences between points miles apart are usually not great enough to be detected by sensory organs.

Some scientists have hypothesized that fishes possess a distinct homing sense which controls migrations without the aid of any environmental stimuli. Others believe that navigational ability in fishes is genetically controlled and passed from generation to generation.

However fish find their way home, they possess an impressive record for not getting lost.

The incredible journey of the salmon is one of the most spectacular examples of fish migration, but even local species like the largemouth bass and bluegills do some traveling.



"Of Grizzly Bears and Mink"

By HARRY A. JACOBSON
*Dept. of Fisheries & Wildlife Sciences
VPI & SU, Blacksburg*

IT started out as a fishing trip. At least that's the excuse I used to get out of the house, even though I had forgotten to get bait and was not an adept enough fly fisherman that I could really be serious about catching any fish. The stream was cold and clear, and the morning was fair. After I had snagged the same log for the third time, I decided to move upstream in search of a pool more suited to my amateur talents. Two hundred yards upstream I took a smoke break. I was sitting astride a large rock thinking about black flies and Minnesota brook trout when a movement on the opposite bank caught my eye. I knew at once it was a mink, but it took a couple of seconds before I realized that I was actually seeing two mink as they rolled and frolicked together beside an old windfall that had become their playground. Two more mink suddenly emerged, as if from nowhere, and joined in what appeared to be a game of hide-and-go-seek, leapfrog, and tag, all combined into one. When I spied a fifth and larger mink gracefully swimming around a large boulder upstream, I realized I was privy to a family outing of one of nature's most elusive creatures. I sat captivated by these amazing animals for more than an hour. They seemed to be made of unlimited energy as they silently scurried up and down the stream bank engaging in mock battles and probing in dark places.

As I sat watching them, I couldn't help but think how perfectly adapted and endowed nature had made this gracious creature for its fitting role as ruler and master of this Virginia watercourse. It reminded me of another carnivore and ruler in his own right that Aldo Leopold had talked about, the grizzly bear. Leopold wrote about the grizzly in the context of its mountain domain and how different a mountain which has a grizzly bear is from one that does not. I thought about the stream and what it would be like without the mink.

I sank into deeper thought and remembered an earlier day in my youth when I had my first and only other encounter with a mink. I was a boy in Michigan seeking my fortune as a trapper. Every morning at 4:00 a.m. I would arise to check my muskrat traps on Black Creek before school. When I found the mink in my trap, it was already dead. Then I thought only of the twelve dollars [the equivalent of sixteen muskrat pelts] the mink would bring. I didn't stop to ponder that Black Creek would, like the mink, someday also die. The signs of ill health were already there. It was choking from nitrogen fertilizer which had run off from nearby

(Continued on page 20)



WILDLIFE MANAGEMENT AT PHILPOTT..

By HAL W. MYERS, JR.

District Biologist

THE Game Commission began management of federal lands surrounding Philpott Reservoir as early as 1952, following the completion of the Reservoir Project. The total land area of 4,474 acres was studied to arrive at techniques which would improve conditions for all species of wildlife present. Initial management efforts were undertaken with only a cooperative understanding between local personnel of the Corps of Engineers and the Game Commission. The first official contract or license between the two agencies was dated August 11, 1959, and remains in effect at the present.

Philpott Reservoir is a man-made lake of some 3,000 acres which lies nestled in the rugged foothills of the Blue Ridge Mountains. Its clear waters in their hilly wooded setting framed by the Blue Ridge Mountains in the distance constitute one of Virginia's larger and more spectacular lakes. The surrounding lands provide hunting territory and area for nature buffs to roam plus space for needed facilities such as boat ramps, picnic and campgrounds.

The entire boundary of the property is now posted with standard 4" X 6" cooperative metal signs. There are two large islands in the Reservoir (Deer and Turkey Island), which are designated as game refuges. Both islands are posted as such with 9" X 12" metal signs mounted on treated backboards.

The size of the area, the ruggedness of the terrain, and limited access have dictated which management techniques could be applied over the years. In the beginning available open areas (home sites and small abandoned fields) were planted to game bird mixture with borders of bicolor lespedeza. Approximately ten to fifteen ¼ acre plantings were made annually utilizing whatever personnel and machinery both agencies could supply. Many of the old bicolor borders are

present on the area today. As the deer herd increased, this type of management was expanded. Small clearings were enlarged and additional areas of abandoned fields were reclaimed. It also became more evident that deer and squirrel were the best adapted game species and should receive priority in management.

A shift was made from annuals to small grain and clover with an occasional planting of corn in some of the larger clearings. A total of fifty clearings ranging in size from 0.5 to 2 acres are presently maintained around the Reservoir. All natural areas such as home sites with fruit trees have been maintained and additional fruit producing shrubs such as autumn olive have been planted.

Timber sales have also been utilized in wildlife management, but these also have been limited due to size of area, timber types, and the local market. Small sales of Virginia pine, ranging in size from three to five acres, have been made around the Reservoir. These have proven very successful in providing additional deer browse and better habitat for rabbits, quail, and a few grouse. There is no market for hardwood pulp in this locality and the use of prescribed burning is not feasible.

A number of additional work and access roads have been developed into remote areas where needed. In recent years there has been a need to gate certain roads to vehicle travel because of improper use which resulted in dumping of garbage, erosion, poaching, etc. It is not felt that additional access is needed on the area at the present.

Since the completion of the Reservoir, numerous attempts have been made at restocking of several game species. The most successful attempt has been with deer which were live-trapped from Michigan and Wisconsin and stocked in the area around 1951. With

the available habitat and water for protection, the deer herd has developed and is producing some of the best trophies in the State. Archery hunting on Philpott has become a favorite for local hunters and the annual archery kill is usually high (10 to 20 animals) for an area of this size. In recent years a doe season has been needed at times to control the herd.

Numerous stockings of wild turkeys have been made dating back to the time when the Commission of Game and Inland Fisheries was producing pen reared birds on the Cumberland Game Farm. Two different release techniques were used on Philpott:

(1) The direct method of releasing mature birds by transporting from the Game Farm for immediate release in the field.

(2) The conditioning method using Turkey Island as a release point for wing clipped mature birds. Feeders were provided and with time the conditioned birds were to move to surrounding areas on their own. A small turkey population has resulted which is believed



Commission photo by Kesteloo

Deer were live trapped and released in the Philpott area in 1951. The area has since become a mecca for bowhunters.

to be a result of these efforts. However, the small acreage, and heavy hunting pressure are considered limiting factors on the turkey. Both the Philpott area and surrounding counties now support a gobblers only turkey season. Additional stocking of live-trapped birds is planned for this locality when brood stock is available.

Other stocking attempts have been made with the following: Reeves pheasants, Kalij pheasants, and the Coturnix quail. None have proven successful.

No attempt has been made to manage waterfowl on Philpott due to the deep shore line and lack of feeding areas. During migration, a fair number of ducks and geese drop in, usually for a very short time.

Until 1968 all wildlife management on the area was supervised by the District Biologist in cooperation with the local Game Warden and Reservoir Manager. Local labor and rented equipment was utilized. A Game Refuge Supervisor located in the adjoining county of

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Turkeys have also been established on the area through releases, but populations presently support only gobbler hunting.

Pittsylvania is now responsible for the wildlife activities with the use of State-owned equipment.

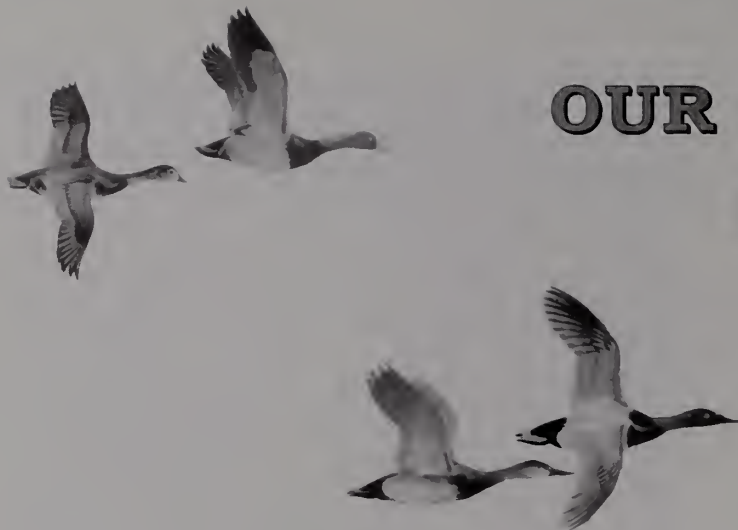
Hunting in the Philpott Lake area is permitted in accordance with all applicable laws for the protection of game. Big game hunters are required to have a damage stamp on lands in Patrick County. Hunting and the use of firearms is prohibited in any wildlife refuge area, public recreation area, or restricted area as marked. Deer hunters are limited to shotguns only on reservoir properties. Regulations forbid carrying loaded firearms on the dam, in or around project structures, buildings or in public use areas. Construction of a duck blind on the reservoir requires a special permit, application for which must be made to the reservoir manager.

Along with the wildlife management program, Philpott has also provided a place to collect research data on mast, squirrels, deer, and fish.



Commission photo by Kesteloo

Some 50 clearings around the lake are maintained as wildlife feeding areas but, unlike this annual food patch, most are planted to perennial crops.



OUR DISAPPEARING CANS AND REDHEADS

By ART HAWKINS

ARTHUR Cleveland Bent in his famous *Life Histories of North American Wild Fowl* refers to "the lordly canvasback, the most famous American game bird, from the standpoint of the epicure." Francis H. Kortright in *The Ducks, Geese, and Swans of North America* states: "The lordly canvasback . . . is the most famous and most highly esteemed of our ducks, not even excepting the grand mallard . . . This super duck is reputed to be the "choice of the epicure" and has achieved worldwide fame as a table bird; a reputation it will no doubt retain."

The reputation of the redhead is somewhat below that of its close cousin but as Kortright pointed out, "... there is no doubt that many a lip has smacked over a fat redhead in the belief that the choice of the epicure (the canvasback) was being enjoyed." He describes the redhead "as one of the finest and most important game birds and among diving ducks ranks second only to the canvasback."

During the past two seasons it has been illegal to shoot canvasbacks anywhere in the United States or to shoot any redheads except in the Pacific Flyway. This is not the first time that these birds were granted such protection.

It was illegal to shoot them anywhere in the United States for four straight years, 1960-63, but then the season was liberalized to permit the taking of either one or two from 1964 until last fall. The closure last fall not only was bad news to duck hunters who like to hunt them but also had far deeper significance. It meant that these favorite game birds failed to increase despite three consecutive years of favorable nesting conditions when legal bag limits never exceeded one "mistake-bird" for either or both species.

Why haven't they increased? Will they ever occur in huntable numbers again? These are the questions crossing the minds of the more thoughtful hunters as well as of biologists and administrators.

Experienced hunters know that even closed seasons

do not provide complete protection from shooting. Especially in the case of female redheads, which are rather nondescript, hunters shoot many cans and redheads by mistake or through carelessness. And closed seasons do not deter some violators.

Perhaps these kinds of waste alone are enough to keep the population from increasing. Whatever the cause, these birds are dying as fast or faster than they are being replaced through nesting. Investigations are underway to find out why this is true. Neither species is considered rare or endangered but both, at present, are too scarce to permit an open season.

The decline in can-redhead populations has its roots in America's earliest history.

Writing about the early 1880's in Minnesota, J. W. Preston stated in the *Ornithologist and Oologist* that "among other game birds are vast numbers of canvasbacks and redhead ducks; both these species remain to breed, though not so plentifully as formerly."

Some of the decrease about the turn of the century in southern Minnesota was due to a deterioration of habitat as carp roiled the lakes and destroyed the preferred food beds.

After leaving Minnesota and Wisconsin, many of the birds stopped in Michigan. Bent quotes Burrows concerning the conditions they encountered there. "... the birds were slaughtered by all sorts of abominable devices, including night floating, punt guns, sail boats, and steam launches . . . as well as by more legitimate methods of decoys."

Finally, the birds reached their Chesapeake Bay wintering grounds. There they encountered every device then known to man for taking ducks. Even a century ago, some people were concerned about the slaughter that was taking place particularly directed at canvasbacks because of their high market value and preeminence for sport.

The situation on the wintering grounds a century ago is vividly portrayed in the February 1870 issue of *Harper's New Monthly Magazine*:

"The enormous prices which are offered for

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canvasbacks are becoming the cause for their rapid extermination. A decrease in their numbers is now imperceptible; but soon, very soon their well-known 'quack' will no longer gladden the ear of the hunter."

These old accounts tell us that canvasbacks by reputation and redheads by association have been harassed by mankind in various ways and places since America was first settled.

The glowing accounts of the great abundance of these birds recorded a century or more ago and the more recent reports of declining status were never documented numerically until after World War II. During the late 1940's and early 1950's, counting methods were devised making it possible to roughly estimate the size of can and redhead populations. For the first time, the sizes of these two bird populations could be compared with each other and with those of other duck populations.

Detailed studies initiated in the late forties show that both species are strongly attached to the potholes and marshes of the prairies. For nesting, they don't like the swamps and bogs of the far north preferred by the scaup and ringnecked duck.

Cans and redheads like to nest in ponds as small as one-tenth of an acre as long as they contain a fairly dense growth of cattail or bulrush in a foot or two of water. Often, these two species will nest on the same small pond but, in the larger marshes, redheads are the more common nester.

Their strong preference for wetlands of the prairies has contributed to the declining status of cans and redheads. These same prairie ponds, so necessary for nesting, have been a primary target of farmers who consider wetlands a nuisance and/or an area that can be used to produce a crop.

Eager to help the farmer, the government has subsidized much of the drainage. The rate at which prime nesting habitat was shrinking caused conservation agencies to launch a massive campaign to save the wetlands. Sportsmen have been major contributors through their purchase of licenses, joining organizations like Ducks Unlimited, etc.

Strike two on the nesting grounds comes with draught. The reason is easily understood if you know where these birds nest. They nest in an area where evaporation rates are high and rainfall is normally low.

After a winter of very light snow, there is little or no runoff from snow melt. This means that the water in the cattails and bulrushes is already shallow when the birds arrive. Shallow water spells danger to the nesters. The water may retreat from the cover even while the birds set on nests, leaving the nests high and dry and exposed to such predators as skunks and foxes. These predators usually do not bother over-water nests.

Wet years are not always good production years either. Sometimes the water comes in cloudburst proportions and floods the over-water nests. Redheads are particularly susceptible to this kind of loss.

Another unfavorable wet situation follows a series of very wet years like the mid-fifties. Potholes and marshes fill to their maximum capacity and are much too deep for over-water cover to exist in the usual places. Instead, new beds of cover are established near the outer rims of the brimful ponds.

Then, as more normal conditions return, the water leaves the highwater beds of vegetation so cans and redheads have no choice but to nest on mud flats.

In recent years, the raccoon has added to their woes by extending its range well into the prime nesting areas of cans and redheads. Raccoons enjoy swimming so over-water nests are well within range of their foraging activities. Add to that this mammal's remarkable intelligence and it means bad news for all nesting birds.

In a normal year, about three out of four can and redhead nests produce a brood. Recently, the success rate has been closer to one out of four in that area and the raccoon seems to be mainly responsible for this lowered success rate. Add to this the fact that some redhead hens have the nasty habit of being parasitic on canvasback nests. The problem comes when aggressive redhead hens not only deposit an egg or two in a canvasback nest but fight the laying can hen in the process. This may cause some eggs to roll out of the nest and be lost.

In Virginia the canvasback and the redhead make up an important portion of wintering waterfowl population in the tidewater section of the State. Most of the canvasbacks and a large portion of the redheads in the Atlantic flyway winter in the Chesapeake Bay and its tributaries, plus Back Bay, Virginia and Currituck Sound, N. C. Thus extensive concentrations of these birds are found in Virginia along the lower Potomac River, lower Rappahannock River, Piankatank River, York River, Lower James River, Back Bay and in the Chesapeake Bay in the waters adjacent to Accomack, Lancaster, Northumberland, Mathews and Gloucester Counties.

If conservation measures such as curtailing or closing the season on flyways and wintering grounds plus management measures on the breeding grounds do not bring the canvasback and redhead back to a shootable population, the hunters in tidewater Virginia may be in for some lean years of waterfowl hunting. In many of our tidal waters these are the principal birds present even during years when their numbers are greatly reduced. It is very difficult for the average duck hunter to realize that there is a shortage of these birds when in the areas that they hunt there are hundreds and sometimes several thousand of these birds in view of their blinds. It is very important Virginia hunters recognize that the canvasback and the redhead are in deep trouble. The fact is difficult to accept since Virginia is one of their principal wintering areas and even though they appear to be plentiful in some of our waters, they are in critically low numbers and therefore the closed season should be respected as the best hope of restoring population.

Carver

Recycles

Outdated

Skills

By TRUDY WILLIS
Roanoke



A realistically painted owl swoops down on an unsuspecting rodent in one of Al's more elaborate creations.



MONETA.—Al Calhoun's "educated hands" made it easy for him to switch professions from body and fender man to wood carver when he hurt his back a little over a year ago.

Calhoun had learned his trade in the days when metal car bodies had to be rebuilt with a pick hammer, a metal file, and a hand that could tell when the job was done without having to be confirmed with the eye.

Since then, plastics have taken the place of the skill and metal has become so thin "you can't work with it anyhow," says the middle-aged Moneta man.

When body and fender work became more of a job than a profession for Calhoun and he could get little personal satisfaction from a job well done, he picked up oil painting as a sideline, selling his landscapes to a Peaks of Otter gift shop as souvenirs.

The proprietor suggested he try carving "because it was in demand and would sell well; not because he thought I could do it well," chuckled Calhoun, as he whittled a tiny hunting dog.

The first thing he tried, a tiny bear with whittling marks still evident, kept him in business supplying as many as he could produce for three months running. Then he progressed to birds which have become his specialty.

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The ruffed grouse which won two awards for Calhoun shows how every feather is carved and painted painstakingly.

A life-sized strutting grouse with tail feathers standing in a fan shape won him a first-place award for realistic painted birds at the International Wood Carvers' Congress in Davenport, Iowa, in 1971. The same year, it stole fourth place at the World Championship Waterfowl Carving Competition in Salisbury, Maryland.

The clinching factor on his prize-winning game bird was that every tiny feather was carved to the point it looked so real "everyone who passed wanted to touch it to make sure it wasn't."

Calhoun was satisfied with the entrance he had made into the carving circles and didn't concern himself with proving his prowess again until he hurt his back last year and found himself dependent on his carving skill for a living. "After all, when I placed fourth in the world championship, the three who placed above me had a combined experience of 80 years—I had only been carving two years," he explained.

A few weeks ago, he entered the Salisbury contest again, without success. His owl homing in on a mouse devouring a real sunflower seed lacked the intricate detail of his grouse. Instead of carving each feather on the owl, he painted them and "the judges could tell the difference."

He just "hadn't had the time to finish it right," he explained, but he's not giving up.

He feels he has a God-given talent, one he almost didn't find out he had, and the only help it's gotten is that of a "good, sharp knife." He never took any lessons.

His models are pictures in bird guide books and occasionally mounted bird specimens from Virginia

A sleek eagle "glides" onto gate post.

Tech. Taxidermist eyes give his creatures a life-like quality.

Calhoun cuts out blanks in the shape of his project with a band saw in a workshop behind his 220-year-old home near Smith Mountain Lake. When it isn't pretty outdoors and he can't work on a bench near two huge red chimneys, he takes his wood into the basement of the house and works in front of their indoor fireplaces.

Work is usually fitted into a babysitting routine for his three children nowadays, but when he can get outside wild quail send him their wishes for inspiration in the form of clear, piercing "Bob White, Bob White" whistles from the overgrown fields behind the two-room log cabin on the property.

Virginia and the natural things she holds play a big part in his creations—the mountains near Floyd County provide the bass wood he needs and occasionally the walnut, the river banks feeding into Smith Mountain Lake provide the driftwood he fashions into bases, and Mother Nature herself provides the subjects.

Mushrooms, eagles in flight, quail on the wing, ducks amid reeds, "Jonathan Livingston Seagulls" in snow white simplicity, and mountain men toting rifles are among his subjects.

One small piece which he is turning out in quantity (each one a little different) portrays hunting dogs treeing a coon. Aside from a few painted stripes on the raccoon, the shellacked natural wood provides the color: one dog takes its red coloring from cedar while another takes its dull brown intonations from butter-nut walnut.

"Carving animals gives me great pleasure," he says, "because they're God's creatures.

"And you sure can't say that about cars."





LIFE HISTORY OF LOGIC

By BILL WEEKES

Spartanburg, South Carolina

THE Bobwhite quail, like all things of life, possesses distinctive characteristics and habits which have evolved for the sake of species survival. Also, like all creatures thus far discovered the quail has been labeled and categorized by human minds. Bobwhites are termed "gallinaceous" birds, and have been placed in the order Galliformes. These words come from the Latin "gallinaceus," which means "hen." Obviously then, quail are fowl-like birds (like other game birds, such as turkey and pheasant).

Birds of the order Galliformes are, most of the time, vegetarian. They are hen-like in appearance with short, stout beaks, and short, rounded wings—powerful in flight. Sturdy feet are adapted for scratching the ground for seeds, and for running with alacrity. Such birds are also gregarious and nest on the ground.

The logic of things natural is evident in the quail, as in other species. Because quail hens lay their eggs on the ground, the eggs, as well as the chicks, are more accessible to predation (from snakes, foxes, cats, etc.) than are birds that nest in trees. What has evolved to compensate for this added danger, so that remnants may survive for future propagation?

First, a quail hen lays many eggs, usually about a dozen (although as many as 37 in one clutch has been recorded). The more eggs laid, the chance of more birds surviving. Logical.

Next, the bobwhite hen lays an egg a day until four or five are laid. Then the hen takes a couple days off before laying more. Presumably this may be a hedge on the exigencies of the future. If the first few eggs are destroyed by predation or mowing, then this would be an obvious tip-off to the hen not to lay the rest of the clutch **THERE**. A hen will move elsewhere and keep laying clutches until one is finally pulled off. Logical.

A clutch of, say, 18 takes three weeks to lay. But the quail (as in other birds) will not incubate as the eggs are dropped. All the eggs are incubated **AFTER ALL** are laid. What a quandry it would be were eggs incubated **AS** they were laid. If this happened, the eggs would hatch consecutively. How could a hen look after chicks already hatched, still having to incubate eggs yet unhatched? Impossible. Therefore, all eggs are incubated the same length of time and hatched within an hour of each other—which is reasonable.

After all eggs are laid, it takes about three weeks before they hatch. How can the female spend all her time on the nest and still acquire food for herself. She expends much energy to incubate. It is not out of a sense of Old Testament morality that the bobwhite, unlike many avian species, is monogamous, with the male sharing the responsibility of incubation and looking after the young. It's logical this should be so.

It's also logical that birds hatched on the ground best not dwell too long in one spot, lest a predator get a "fix" on the nesting site and close in for the kill. Therefore, within a few hours after hatching, quail chicks are able to leave the nest for good. Birds leaving the nest soon after hatching are termed "nidifuges" or "nest fugitives." Obviously, a quail hen could not pick up a brood of a dozen chicks and move it very far. Therefore, these very young quail must be able to move on their own almost immediately. Logically, the chicks, soon after hatching, must be able to see, be able to walk, or run, on well developed legs, and be able to feed themselves. Gallinaceous chicks, therefore, are physically precocious. Such birds are called "precocial," as opposed to the "nidicole" (nest dwelling) "altricial" birds which hatch naked, blind and too weak to support themselves—birds such as the robin, sparrow and other passerine (perching) songbirds.

Although adults are vegetarian, the chicks need quick energy and feed mostly on insects their first two weeks (when they can't as yet fly). In one study by Handley and Stoddard, it was found that 84 percent of the food eaten by 20 chicks less than two weeks old was of animal origin. So when would it be logical for these chicks to hatch? Wouldn't it be about the time when insects begin proliferating? The nesting period of bobwhite begins (in the South) in late April, or early May, with the chicks hatching about six weeks later. Since nesting continues through the summer, little ones are hatched from June to September.

Although quail chicks are much more well-developed than altricial fledglings, this does not mean quail chicks are independent of their parents. Robert Leo Smith, biologist, presented four classifications of maturity in hatching for precocial birds. Birds may be completely independent of parents; follow parents and be fed by them; follow parents, but find their own food; or—

(Continued on page 20)

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CONSERVATIONGRAM

Commission Activities and Late Wildlife News . . . At A Glance

ENEMIES LIST STARTED FOR GYPSY MOTH. With the tree defoliating pest creeping into Virginia and well established in other areas of the Eastern United States, the U.S. Department of Agriculture is studying some of the more than 100 species of insect parasites known to use the gypsy moth. The moth's caterpillars defoliated more than one million acres of trees in the Northeastern States in 1973 and, despite the use of insecticides, the moth has continued its wandering expansion southward along the Appalachian range of mountains. By contrast, in Europe and Asia little damage is reported from Gypsy moths. There the pest receives heavy pressure from insect parasites. Unfortunately, when the gypsy moth arrived in the United States, few of its natural enemies came with it. Native American parasites have had little effect on the gypsy moth. To combat this imbalance, the U. S. D. A. is experimenting with wasps and parasitic flies imported from Europe. If successful, the experiment could lead to the release of some of the insect species which could prey on the leaf gobbling gypsy moth caterpillars and remove them from the list of important pests.

NEW WILDLIFE MANAGEMENT AREA MAP SERIES AVAILABLE. The first eight maps of a new series covering the Game Commission's Wildlife Management Areas as well as some other important hunting and fishing spots will be available soon. The maps, in full color, will give the sportsman a detailed look at the area involved and will show all roads and trails along with lakes, streams and other important geographical features. Contour lines are also included. The map's reverse side features descriptions of the area, notes on the hunting and fish found in the region and some ideas on interesting spots for sightseeing in the general area. The first maps in the series include the following wildlife management areas: Hidden Valley; Hagy; Hardware River; Apple Manor and White Oak Mountain. Also included as part of this set are maps of York River State Park and Quantico Marine Base. These colorful and informative maps will be available from the Commission of Game and Inland Fisheries, 4010 W. Broad St., Richmond, Virginia.

STREAM CLASSIFICATION SYSTEM STUDIED. A public hearing on a proposed trout stream classification system for Virginia was held in Waynesboro, Virginia, in January. The new system should provide information for the formulation of management plans for all trout streams in the Commonwealth. The plan would include management of streams according to their potential. The system should also help restore some of our native brook trout fishery as well as create more diverse angling opportunities for Virginia anglers and increase the number of trout streams under active management.

"OUTDOOR RECREATION--A LEGACY FOR AMERICA" is the title of a new publication from the Bureau of Outdoor Recreation. The new book details the current plans to improve the management and increase the availability of outdoor recreation programs. Colorfully illustrated, the book sells for \$3.45 from the Superintendent of Documents, Government Printing Office, Washington, D.C. 29402.



Oblique section of white-tailed deer hair (200x) showing air pockets in medulla.



Cross section of striped skunk hair (1000x) showing basic components of hair: (A) cuticle; (B) medulla; (C) cortex.



Mink hair (600x).

WHEN A MAMMAL LEA

By JAME
Graduate Stu

ANY self-respecting burglar knows not to leave his fingerprints at the scene of the crime, for they provide the police with positive identification of the criminal. A mammal may also leave behind positive identification, not of its name, of course, but of its species. Its "fingerprint" of identification lies in its hair, which is sometimes markedly different in structure from that of other species.

Scientists, wildlife biologists in particular, need to be able to positively identify species. In conducting food habits studies they must know what species the predator preys upon. Since hair is one of the few things that will pass through the gastrointestinal track undisturbed, it could provide the biologist with a major clue. It can be found intact not only in predators' stomachs, but also in their droppings and the pellets regurgitated by birds of prey. The species occupying a den can sometimes be determined by collecting and identifying hair samples from around the entrance. Proper hair identification could also be useful in determining the type or authenticity of a fur piece. Only a little imagination is required to visualize the possibilities of positive hair identification in law enforcement.

Basically, a mammalian pelt consists of two types of hair, underfur and guard hairs. The underfur is relatively fine, short, and abundant. It is this type that comprises the luxurious fur pieces. Guard hairs are longer, more durable, thicker, much less abundant, and are interspersed throughout the underfur. However, on some small mammals the two hair types are virtually indistinguishable. Since guard hairs are more likely to be encountered due to their larger size, investigators have chosen them for most of their hair studies.

Scientists have known for nearly a hundred years that all hair consists of pigment granules, a medulla, a cortex, and a cuticle. However, they also found that the relative abundance of these basic structures differs

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ES ITS FINGERPRINTS

SPIERS
VPI & SU

from mammal to mammal. In particular they noted that the cuticle, which consists of differently shaped scales, differs from one mammal to the next. Many investigators thus endeavored to formulate hair identification keys based primarily on the structure of the cuticular scales.

This area of study has not been without its problems. To be observed under the conventional light microscope an impression of the hair has to be made in a gelatin substance. Thus the scales are viewed from the cast, not from the hair itself. The preparation of the cast can be fairly time consuming. Secondly, the light microscope does not magnify to a high degree. Although there are many glaring differences among some hairs, there are just as many similarities. Therefore no one has yet been able to distinguish among all mammalian species on the basis of hair alone.

A study is now underway at VPI&SU to resolve these problems by using the electron microscope. This is a highly sophisticated and costly piece of machinery which has a number of advantages over the conventional microscope. First of all it can magnify an object many thousands of times. It also has a tremendous depth of field, which means a three-dimensional view can be obtained with all parts of the object in focus. A permanently mounted polaroid camera can snap off a beautiful electron photomicrograph in twenty seconds. A file of photographs and negatives of hair is much more easily stored and maintained than a file of impressions. Of course duplicate prints can readily be produced from the negatives.

The electron microscope may still not reveal enough surface structure to differentiate among all mammals in Virginia, although it is hoped that it will. Preliminary indications are encouraging. If the method is indeed successful, the mammals of the state will have to be more careful in wiping away their "fingerprints" to maintain their anonymity.

FEBRUARY, 1974



Smoky shrew hair (200x).



A technician operates the electron microscope used in this field of study.



Pigmy shrew hair (2000x).

THE SNAKES OF VIRGINIA



Part I. Poisonous Snakes and Their Look-alikes

By JOSEPH C. MITCHELL

Department of Biology
Virginia Commonwealth University
Richmond

THERE is no group of animals more maligned than the snakes. Countless numbers are killed in Virginia each year because they are considered "poisonous" when, in fact, most are actually harmless. Many are beneficial to man in one way or another. Several species are important because their diet consists mainly of rodents. Ask any farmer who has a blacksnake or two around his barn. He'll tell you that if it wasn't for the snakes, his barn would be overrun with rats. But there are many other species besides the blacksnake which are beneficial—and harmless. Too many of the latter kind are killed simply because they *look like* poisonous snakes.

Snakes are important links in the natural environment just as fish or deer. They, too, deserve to be recognized as such by man.

My purpose here is to discuss the identification of snakes, especially how to tell which ones are poisonous and which ones are not. Part I consists of the poisonous snakes and those that may be confused with them; Part II will contain the remainder of the species found in Virginia. Many other aspects of the habits and behavior of snakes are omitted for various reasons. I suggest that the reader check the references for more specific information.

Identifying Poisonous Snakes

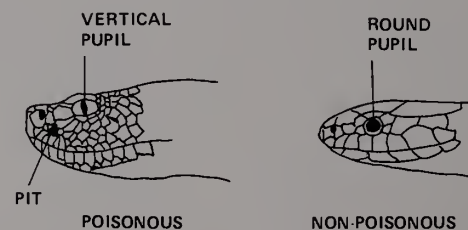
Of the 36 species and subspecies of snakes in Virginia only 4 are poisonous. How do you tell them apart? It is easy to identify rattlesnakes, but what if the snake has no rattle? The following lists five points which I think are important to remember in order to recognize poisonous snakes:

1. All the poisonous snakes of Virginia are pit vipers; that is, they possess a heat-sensing pit. It is located a little below the mid-point between the eye and nostril on each side of the head. No nonpoisonous species have it. (See illustration)
2. Our poisonous snakes have a single row of scales going clear across the underside of the forward portion of the tail. Nonpoisonous snakes have two rows down the entire tail. (See illustration)
3. The eyes of our poisonous snakes have vertically elliptical pupils—the pupil is round in nonpoisonous snakes.

4. Study the range maps for the individual species. If you are any considerable distance outside the shaded areas, you can be fairly assured that you will not run across that particular species.
5. The best method, by far, is to be able to recognize the color patterns and body form from a distance. Read the descriptions and compare these with the illustrations. Go to a zoo or museum and study them. It is always wise to look at caged live snakes or preserved ones—it gives an added perspective.

Let me point out that the differences apply only as a general rule. Never handle a snake unless you are absolutely sure it is nonpoisonous. Unless you have a good reason, it is best to leave them alone. They will avoid you if it is at all possible.

HEAD DETAIL



VIRGINIA'S POISONOUS SNAKES

NORTHERN COPPERHEAD, *Agkistrodon contortrix mokeson*. Found state-wide. Look for the hour-glass patterns of dark or reddish brown on a background of light brown to reddish gray. Head: usually a coppery color. Dark spots along the sides of the belly. Young: like adults but brighter with a sulfur-yellow tip of the tail. Length: 8 to 48 inches. Habitat: almost anywhere there are rodents—barns, lumber, junk, and sawdust piles, berry thickets, rock ledges, edges of fields, haystacks, etc. Some hibernate with the timber rattlesnake in the mountains. Food: essentially rodents and insects but birds and frogs are also eaten. One to seventeen young are born from mid-August to early October.

EASTERN COTTONMOUTH, Water Moccasin, *Agkistrodon piscivorus piscivorus*. Found only in the southeastern corner of Virginia. None found above or

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farther west than Colonial Heights. Generally, a drab snake with dark, wide, brown, olive or black cross-bands on a lighter background of the same colors. Old ones are almost uniformly dark. Inside of the mouth is white. Young with brown bands on a cream-to-light brown background with the tip of the tail colored sulfur-yellow. Length: 8-60 inches. A water-loving species found near quiet bodies of water—swamps, ponds, slow streams, and ditches. Will eat almost anything including rodents, birds, other reptiles, amphibians and small turtles. One to fifteen young are born alive from mid-August to mid-September.

TIMBER RATTLESNAKE, *Crotalus horridus horridus*. Found only in the western, mountainous portion of Virginia. Two color phases. Black phase: the head and posterior 1/3 of body black and the black saddles and incomplete chevrons are almost obscured by amounts of black pigment in the ground color areas on the rest of the body. Yellow phase: head with little black pigment; saddles and chevrons always evident, these being black or brown. The tail is black in both phases, with no stripe on side of the head. Young: patterned like the yellow phase but less brightly colored. Length: 10-60 inches. Hibernates in rock outcroppings in winter and scatters in the summer to areas such as second-growth clearings, berry patches, orchards, and other rocky areas. Food: primarily rodents but small birds, frogs, and other snakes are occasionally eaten. Five to 17 young born alive in August and September.

CANEBRAKE RATTLESNAKE, *Crotalus horridus atricaudatus*. Found only in the southeastern corner of Virginia. Similar to the Timber but has a dark reddish stripe running down the middle of the back splitting the blotches or chevrons on the anterior one third of the body. Background: grayish brown to pink. Major feature is the dark stripe running from the eye through the back of the jaw to the belly. Young: like adults but paler. Length: 11-72 inches. Inhabits lowlands near swamp, cane fields, low pine woods, and ridges and glades of the Dismal Swamp. Food: primarily rodents but also eats insects, birds, and other reptiles. Five to 17 young are born in late summer.

CORAL SNAKE, *Micrurus fulvius*. **Not** found in Virginia.



Sinister looking but harmless hog-nosed snake.

HARMLESS LOOK-ALIKES

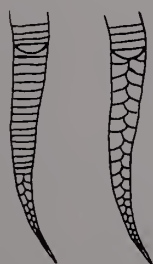
EASTERN SCARLET SNAKE, *Cemophora coccinea copei*. A coral snake look-alike found in the Eastern Piedmont and Coastal Plain. A sharp-snouted snake having bands of red, bordered by black with white or cream interspaces. The bands do not go all the way around. The snout is red. Length: 6-24 inches. Found in or near areas of sandy or loamy soil, under boards, logs, and rocks. Food includes mice, lizards, and small snakes. Lays three-eight eggs in June.

EASTERN HOG-NOSED SNAKE, *Heterodon platyrhinos platyrhinos*. Found state-wide. Coloration is highly variable: may be spotted with black, brown or red on a background of yellow, gray or brown. May be completely black. The most distinctive feature is the upturned snout which is used for burrowing. Belly: usually gray mottled with darker gray or brown. Young: like adults but brighter. Length: 5½-30 inches. Usually associated with sandy soil. Hognosed snakes are most often found above ground rather than under objects. Lays 4 to 46 eggs in June and July. Food: primarily toads but frogs, salamanders, fish, insects, worms, and small rodents are sometimes taken. Called spread-head moccasin by some people, it will bluff by spreading its head and hissing, eventually "playing possum" if molested.

SCARLET KING SNAKE, *Lampropeltis triangulum elapsoides*. Found only in the extreme southeastern corner of Virginia, having a red snout and red, black and yellow (or white) bands that completely surround the body. The black always separates the red and yellow. Length: 5 to 24 inches. Very secretive; found beneath bark, logs, boards, near or in pine woods. Food: mice, small birds, lizards, small snakes. Lays 5-17 eggs in June.

EASTERN MILK SNAKE, *Lampropeltis triangulum triangulum*. Found in the western and extreme northern counties. A rather slender snake with a triangular blotch on the back of the head, three rows of blotches (1 large and 2 smaller rows) of reddish-

Underside of tail.



POISONOUS

NON-POISONOUS

brown color bordered by black. Background color is light gray; is white with square blotches of black. The young have bright red blotches. Length: 7-40 inches. Secretive; usually found under boards, rocks, and logs in barns, mountainous fields, and rocky hillsides. Food: primarily rodents, but also eats snakes, lizards, frogs, salamanders, birds and their eggs, and insects. Six to 24 eggs are laid in June.

COASTAL PLAIN MILK SNAKE, *Lampropeltis triangulum temporalis*. Piedmont and Coastal Plain of Virginia including Eastern Shore—very much like the eastern milk snake, but the large brown blotches look almost like bands by extending downward to the belly which is colored with black spots. Ground color: gray, tan, or yellowish. Usually a light “collar” around the neck. Young: like adults but brighter. Length: 5-35 inches. Usually found in association with sandy soil under logs and rocks, sometimes plowed up in fields. Lays 6-20 eggs in June.

Leonard Rue photo



NORTHERN WATER SNAKE, *Natrix sipedon sipedon*. Found state-wide. Coloration: extremely variable—pale gray to dark brown with reddish brown to black markings. Old adults may be almost black or dark brown. Look for three major characteristics: (1) dark crossbands on anterior 1/3 of the body, blotches on rest (2) blotches and bands are larger than areas between them and (3) red to black half moons on the light (cream to yellow) belly. Young: brightly patterned. Length: 5½-48 inches. A snake of streams, ponds, ditches and swamps—virtually anywhere there is water. Can be found under rocks, logs, in vegetation and debris in or near water. Food is primarily slow-moving fish, frogs, salamanders, and crayfish. Eight to 30 young born alive in August and September.

BROWN WATER SNAKE, *Natrix taxispilota*. Only in the southeastern corner of Virginia. One row of squarish, dark-brown blotches down the back and a row of similar spots on the sides, alternating with each other on a background of lighter brown. Blotches in old ones obscured. Belly: white to brown, marked with spots or half-moons. Young: like adults but brighter. Length: 3½-60 inches. Inhabits quiet waters such as ponds, lakes, swamps, and large ditches. Feeds on fish, frogs, and salamanders. Nine-40 young are born alive in August and September.

Poisonous Snakebite

The most frequent question I hear is, “What should one do if bitten by a poisonous snake?” My first answer is always to immediately seek medical help. The doctors have the knowledge and equipment to handle such cases; most of us do not. Therefore the safest thing is to get the patient to a hospital as soon as possible.

The venom of Virginia’s poisonous snakes is primarily hemotoxic: that is, it destroys blood and lymph cells. This process takes a little time and a bitten person can usually reach medical help before any major damage is done. However, if you are far away from any transportation the following measures can be taken to slow down the effects:

1. Make *absolutely* sure that it was a poisonous snake that bit you. Otherwise these steps may do more harm than good.
2. STAY CALM! An excited person’s blood and lymph circulates faster and helps distribute the venom quicker. Do not drink alcohol.
3. Apply a constriction band or ligature between the bite and heart. Do not make it too tight and it should be released for 90 seconds every 10 minutes.
4. Make a longitudinal incision ⅛ to ¼ inch long and about ¼ inch deep at the site of the bite with a sterile blade. Do not make multiple incisions.
5. Apply suction at this point with a suction bulb or with the mouth if there are no cavities or ulcers. Steps 4 and 5 are of little value if not done within the first 30 minutes.
6. Administer antivenin yourself only if absolutely necessary. This should be left up to the doctor.

It is a rare case in Virginia when these steps have to be taken. In most cases there has been sufficient time to get the patient to the hospital.

Protective measures should always be taken when in the field. You should always be careful of where you place your hands and feet. Most bites occur from situations where the person did not look before he acted. The only measure that can be taken to keep poisonous snakes from your yard and work areas is to minimize the attraction of these places to rodents. Where there are mice and rats, snakes will soon follow.

Suggested Reading

A Field Guide To Reptiles and Amphibians, by Roger Conant, Houghton and Mifflin Co., New York, 1958.
Field Book of Snakes, by K. P. Schmidt and D. D. Davis, G. P. Putnam’s Sons, New York, 1941.
The World of the Snake, by Hal H. Harrison, J. B. Lippincott Co., Philadelphia and New York, 1971.
Poisonous Snakes of the World, United States Government Printing Office, Washington, D.C.

NATURE'S ENGINEERS

By SHARON SAARI
Warrenton

BEAVER controversy?

"What beavers? we haven't seen any in our District for years."

"We got lots of beavers; too many in southern Virginia."

"In my opinion the beaver must be eradicated as destructive wildlife. If we want to use the land, the beaver must go," says Southside Soil & Water Conservation Director William Vaughn.

And so the arguments flew at the annual meeting of Virginia Soil and Water Conservation Directors from around the state at the annual meeting in Roanoke.

In the legislative committee, Southside District drafted the following resolution:

"Whereas the beaver population along streams has increased to such numbers that they have become a destructive nuisance, their dams block up the channels of streams, flood the land destroying crops, timber and sometimes cause the stream to cut new channels, the result of which is a lot of erosion and silt.

Therefore, we request that such action as is necessary be taken to require the Commission of Game and Inland Fisheries to eradicate the beaver from areas that are being so damaged when requested to do so by damaged landowners."

This resolution was not acted upon.

Beavers were almost totally eliminated around the early 1900's. The Game Commission restocked them and laws protecting them were passed. The beaver population came back, in some parts of the Commonwealth.

Too many beavers for some landowners. Beaver dams block natural streams, flooding bottomlands with shallow ponds. Crops are no longer feasible on this fertile soil. Forests are either flooded out or chewed down.

"I remember one poplar forest, looked like it had



Soil Conservation Service, USDA, photo

Once extinct in most of its Eastern range, the beaver has made a spectacular comeback, too much so some say.

been mowed with a mower, all stumps about this high," a District Director recalled.

"We had a beaver pond," another recalls; "it flooded the road. People would drive through it, then their brakes would give out. They created a real danger here."

True, beavers build where they want, not where man always chooses. Some beavers prefer SCS farm ponds. Beavers were reported digging homes in banks and earth dams. Beaver ponds and SCS ponds produce similar benefits. Not all SCS men are against beavers. They share a common interest in dam building.

Les King, SCS conservationist in Loudoun County, says, "We are trying to get a pair of beaver for our Izaak Walton League pond. They are interesting creatures for the youngsters to watch."

When asked who creates the best ponds for wildlife, beaver or SCS, Dave Grimwood, State Conservationist, admitted the beaver. Now, flood control, that's another story. . . .

But the beaver has a more important function to man in soil and water conservation. Water conservation and raising the water table by beavers are probably more appreciated in the arid West, than here in Virginia. Beavers were transplanted into Utah, California, Colorado, Idaho, Missouri and other western states for the purpose of water conservation. W. L. Finley reported the removal of 600 beavers from western ranges caused reduced forage on pastures and a loss of \$50,000 annually to stockmen. E. R. Warren reported 14 beaver ponds used for irrigation saved fruit growers \$15,000 a year. It has been estimated that

each beaver pond in Cochetop National Forest stored enough water to irrigate 30,000 acres for one day.

Dams also raise the water table and help protect the watershed, as the PL 566 ponds do. The beaver dams slow the stream waters and "keep the raindrop where it falls." Each pond serves as a small flood control structure, but with no public expenditure of funds. It has been reported that beaver ponds slow runoff by 19 days.

Beaver structures also act as silt traps, protecting the quality of water. These smaller dams upstream help protect more expensive man-made reservoirs downstream from silting in. Beaver ponds not only trap silt, in the weedy growth and logs of the dam, but also contribute organic matter to "make" rich soils. G. A. Leisman reported that in a shallow sedge marsh, organic matter accumulated at a rate of 5,500 pounds per acre annually. At this rate one foot would be deposited in 24 years. This plus old rotting timber, and the trapped topsoil, will make fertile bottomlands for tomorrow's crops and timber.

The most important aspect, however, is wildlife habitat created by beaver. Deer, raccoon, mink, and wading birds are found along edges. Most Virginia beaver ponds support a pair of ducks and a variety of panfish. Beaver ponds create an ideal wood duck situation of shallow waters surrounded by dead trees. A management program of woody boxes and planting millet can produce 25 ducklings per acre. In an eight-acre pond in North Carolina, 27 broods were hatched in one season from nest boxes.

The beaver story has two sides. Soil and water conservationists should see benefits in maintaining soil and water in place. Farmers whose lands are damaged or flooded could perhaps receive a tax break, under Virginia's new "Land Use Tax," for preserving open space. Hunters and fishermen can continue to enjoy the wildlife habitat created by beaver. When pros and cons are weighed, the furry engineer with a paddle tail is an asset to Virginia!



Photo by Bureau of Sport Fisheries and Wildlife

Broods of young ducklings find abundant food and concealing cover in beaver ponds. They will grow up to give many sportsmen pleasure in the fall.

Grizzly bears and mink

(Continued from p. 5)

fields; housing developments were encroaching dangerously close to its banks; and sewage outlets were frequent along its course. Ironically, it was near one of these sewage outlets that I had set the trap which caught the mink. What an indignant end to such a noble beast.

Today, like so many other creeks, streams, and rivers, Black Creek is dead. Its banks have been straightened and its bottom dredged. New subdivisions no longer encroach on its banks. Now in many places it has been diverted underground and the housing developments have been built over it. In fact, I can't help but wonder if the last mink of Black Creek may have met its end in my trap near the sewage outlet.

Laughter from two fishermen upstream sent my mink to cover. As I walked the road to my car, another car sped by. As it rounded the curve, a tin can clanked noisily against a rock and then splashed into the stream. I wonder how long before this stream, like Leopold's mountain, will have no ruler. Will the mink someday join the list of threatened wildlife with the grizzly? And will this stream, like Black Creek, die?

Quail

(Continued from page 12)

and the quail falls into this category—follow parents, but are shown food.

It takes the chicks only two weeks to mature enough to fly, but then they can only do so for short distances. But at the age of two months the young quail will flush with considerable speed, flying rapidly to distant cover. By age 13 weeks, the young quail are hardly distinguishable from their parents.

Quail stick together as a family until fall and winter. In fact, the average covey of 12-15 birds will include members from more than one family. Commonly, in cold weather, they roost on the ground in little bunched circles, heads outward and tails pressed very tightly against one another so that they stick straight up in the air. This behavior encourages heat conservation, and, therefore, energy conservation. This behavior utilizes the principle that a large living body loses heat at a slower rate than a small body because larger bodies have less surface area exposed for their weight. It's logical, therefore, that quail bunch together.

When a covey is flushed by the hunter, the members scatter into singles. Therefore, if harm comes to one of the covey, it is less apt to spill over to other members.

When the mating season arrives in the spring, the scheme of things unfolding seems reasonable. The male quail, like males in other species, sets up a territory which is, for the most part, honored by other males of the species. Having territories makes life a little simpler. Instead of expending energy chasing off encroachers, the "married" pair can go about the business of mating and seeing to the survival of the young.



HANDLING QUALITY FUR

By JAMES R. BOLDRIDGE
Disputanta

ON looking around at the fur sale recently held by the Virginia Trappers Association one could almost tell who put up each batch by the appearance of it. Probably all who handle fur would like to do a first class job. There are three possible reasons for sloppy work, namely fatigue, lack of time and ignorance. The men who do good work do it consistently, so that cancels the first two.

Of the furs available in Virginia, only the beaver should be skinned open. It is permissible to open coon, but it is easier to handle them "cased." A cased skin is removed by slitting along the back of the hind legs and peeling the skin off over the head like a glove turned inside out. Only the fox and bobcat should be stretched with fur out. All animals that have fur on the tails should have the tails skinned, and if the feet are to be left on they are to be skinned out to the toes, not cut off at the joint. It is a problem to remove dried blood from fur, so it is best not to get blood on it, and if it does get bloody to wash it off before it dries. All mud, burrs, etc. should be cleaned off. If the fur is wet I prefer to go ahead and skin it, whip it a few times to flip off what water I can, then hang by the nose with fur out. Do not leave unskinned animals lying on the floor and do not hang by a hind leg. In most cases the skinning goes better if begun as soon as possible, preferably while the animal is still warm. The exception to that is the beaver. He is best chilled.

The muskrat, mink and fox skin comparatively easily with little fat. Coon, skunk and possum are often very fat and take a lot of cleaning up, but scrape rather easily. The otter and beaver are hardest to handle. It is

possible to do a clean job of skinning on both of the latter, but the fleshing beam is the real answer.

The old way of cleaning small skins, up through fox and coon, was to make up a small board of substantial material, shaped somewhat like a tiny ironing board and fasten it firmly to the bench. The skin was pulled over this inside out and a B. & L. tool or something similar was used to clean it up. This is as good as anything for mink and muskrats. The fleshing beam is borrowed from the professional tanner. It is a sort of two legged sawhorse, and can easily be made from a smooth, peeled, dry log eight inches in diameter. The legs are easiest made from a symmetrical fork of suitable size, mortised into the bottom of the log ten inches from the end. To use, put on an apron (two cotton feed sacks belted around the middle work fine). Lay the skin over the end, lean forward on it and use the knife with a pushing motion. A dull drawknife is the most convenient tool, but an old lawnmower blade, a spring leaf, or any such piece of steel can be used if suitably ground. It should be dull, remember that! Most skins work when fleshed from head to tail, but otter are best handled the other way. Be sure to keep the beam clean. Buyers will holler long and loud if you get grease on the fur. After the flesh is freed from a fatty skin, turn the back of the knife to the skin and go over it again. A surprising amount of grease can be removed in this way. After the skin is on the stretcher it should be wiped thoroughly with a clean cotton cloth. Some even wash with mild soap and warm water, rinsing and wiping at this point.

Trapping is a feast and famine business. I do not like to let an animal go until the next day before



Commission photo by H. S. Mosby

Careful preparation can make a big difference in what fur buyers offer for your pelts.

skinning, but if the animal is stored in a cool place and hung up it usually will not hurt anything. At any rate I skin all my catch before I bother to flesh or stretch anything. If there is no more time, I roll the skins up individually with fur out, wrap in newspaper and store in the freezer, attending to them as soon as possible. Under most conditions, a skin can be turned fur out and hung by the nose overnight without harm.

Many seem to think they can pull a board off the shed and taper the front with an axe to serve as a skin stretcher, and so they can. To put it kindly, the results will not be very professional. The matter of stretchers is next in importance to that of traps. For muskrats the wire stretchers cannot be beaten. For mink and weasel a small, one piece board used with a full length wedge on the belly side does fine. Both stretcher and wedge should be carefully shaped and sanded smooth. For the larger skins, half inch material of poplar, white pine or fir is excellent. Most of us use a two piece stretcher for the larger skins. I shape mine on a bandsaw, but a hatchet will do. The halves are edge planed to make them symmetrical, then the edges are tapered, rounded and sanded. A spreader strip is attached to one side at the bottom and the halves numbered. To use, C clamp the loose half to the spreader strip, pull the cleaned skin on and nail in place. Now loosen the clamp, spread and tack the loose half in place. In the case of skins that are to be turned fur out the skin needs to dry long enough to lose the sticky quality of a wet skin, but it still has to be flexible enough to be turned inside out. Usually one day is about right, but if drying conditions are real good it can be too much. In this case you have to wrap the skin in wet cloths and wait.

For stretching beaver there is nothing better than a three foot square of five eighths fir plywood. Many use half inch pine and a built up job of boards and battens is not bad. Six penny finishing nails are right, and you will need plenty. Do not use pliers to pull the

skin tight. If the stretching is too well done the edge will ravel off when the skin dries and shrinks. Since a round shape is desired, it helps to draw circles on a beaver board. Start with a nail in the nose, then one in each side halfway down and then one in the bottom. At this point there must be considerable slack. Now put in four more nails, halfway between the first and continue halving the distance, pulling out to the circle each time. When the nails are only a few inches apart you can fill the spaces with nails about three quarters of an inch apart. A skin can be stretched on each side of a good board.

No chemicals are to be used on raw fur! Some have not gotten the word on this. This sort of thing makes it harder for the tanner and is not wanted. Anyone who does use salt, degreasing agents, etc., will pay for it in smaller checks.

Drying fur can be a problem, especially in a damp season. Then some have to work in a basement, or other marginal shelter. During damp weather drying fur should be checked every day. Mold is apt to start and if it is not checked it will cause damage. Ventilation is essential and will usually do the job, but I have had to use just a little heat on occasion. This is a ticklish thing but I've found an electric heat lamp used sparingly works well.

As a final touch, all fur out skins including beaver, should be gone over with a comb. A metal comb is best but an ordinary currycomb is OK.

Most prefer to sell fur locally. It would appear with a middleman making a profit there would be less money for the trapper, but this is not necessarily so. Dealers are able to sort fur and ship graded fur, getting a higher price for it. Many trappers sell their animals unskinned, and it may be justified in some cases. One man can only do so much work.

If the fur is to be shipped, the first thing is to decide on who to ship to. Better check around a bit, and this is one way the Trappers Association can help you. To prepare the fur, sort by species and tie each bundle. Wrap the greasy skins in plenty of newspaper and tie the whole into a bundle and wrap again in paper. Now rip out a burlap feed sack and sew tightly around the bundle with the inside of the sack turned out. Be sure to put a card inside of the pack with your name and that of the consignee and the shipper, with their addresses. A Magic Marker does very well for this. Burlap makes a very strong and light package.

A personal case may put a little emphasis on what has been said. I carefully cleaned and stretched my muskrats, using commercial wire stretchers. They were properly cleaned and dried. I have a young cousin who also caught a few. His were not so well fleshed, and were stretched on boards that were crudely chopped out. Both lots were good prime skins with no cuts or bites. I received \$2.60; he got \$1.50. Both lots were handled by the same dealer at the same time.



Edited by ANN PILCHER

WINNING PLOTS CHOSEN

Bobby Tucker of Gretna planted and cultivated the winning wildlife food plot in the 1973 Pittsylvania County FFA Wildlife Seed Plot contest. According to information released in December, Bobby, the son of Frederick Tucker of Gretna, is a member of the Gretna Jr. High FFA. Other winners include Barry Robertson of Tunstall and Johnnie Pyron, Dan River. Representing other FFA chapters in the county were Trent Hicks, Blairs; Michael Burnette, Chatham; and David Worley, Gretna Sr. High.

According to Charles J. Franks, director of vocational education in Pittsylvania County schools, the contest helps to make participants aware of the conditions necessary for continued abundance of wildlife. They must select

a site for planting in relationship to cover and water. They learn which seeds are desirable as wildlife food by noting that millet, soybean, rape and pea seeds are included in the planting materials mixture provided by the Game Commission. Resultant grains furnish food through winter months for deer, turkey, rabbits, quail and songbirds. Over 550 bags of seeds were distributed through the six county vocational agriculture departments this past spring.

The Pittsylvania Izaak Walton League aids in this contest by furnishing cash prizes which are presented to winning FFA members at an appropriate activity of the local chapter. District Game Biologist Hal Myers, Jr., served as contest judge.



Jimmy Harrison and his prize winning deer head.

THIRD BEST IN EASTERN VIRGINIA

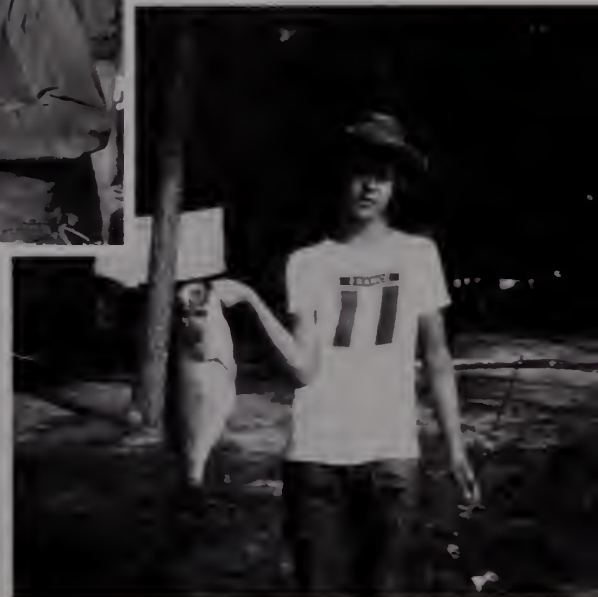
Head and rack of a 160 pound 8-point deer downed December 27, 1972, brought third place honors and a trophy to 14-year-old Jimmy Harrison of Waverly on October 27 when judging in the Eastern Regional Big Game Trophy Contest was completed. Held at Newport News' Deer Park Elementary School, the event was sponsored by the Virginia Peninsula Sportsmen's Association. Jimmy's 171-5/8 point rack also won fourth place in the State Contest judging held the same day. For this he received a gold certificate from the Virginia Game Commission.



Gretna Jr. High FFA Chapter members look on as M. A. Burnette, vocational agriculture teacher, and Bobby Tucker, Pittsylvania FFA wildlife seed plot winner, examine plants.

SHADES OF SUMMERTIME

August 26 was the day when Richmonder Eric Lawrence weighed in this 8 lb. 4 oz. 24" long largemouth bass at American Heritage Campground on the North Carolina side of Lake Gaston. He landed it with a spinning rod using plastic worm lure.





Edited by MEL WHITE

LIONS HOST 2nd ANNUAL DECOY AND ART SHOW



The Second Annual Richmond Wildfowl Carving and Art Show will be held at Holiday Inn West, 3200 W. Broad Street, Richmond, on February 16 and 17. Show hours are 10:00 A.M. to 10:00 P.M. on Saturday and 10:00 A.M. to 5:00 P.M. on Sunday.

This show, sponsored by the Northside Lions Club, attracts carvers and wildlife artists from all over the eastern U.S. as well as many fine talents from the Old Dominion.

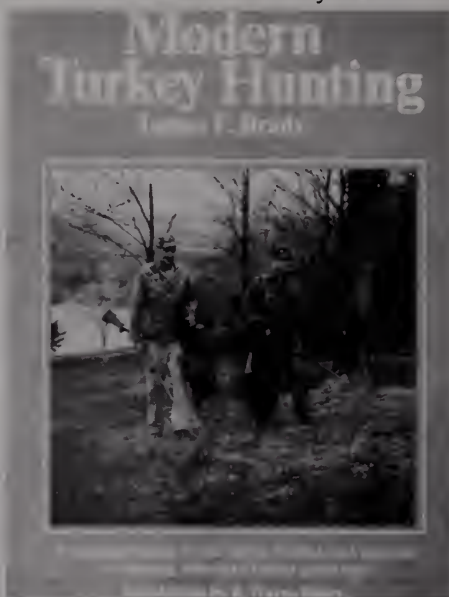
The show will include carvings of all types of birds from songbirds to waterfowl. Paintings by well known artists will also be on display. A nominal admission fee will be charged with the proceeds being given to charities by the Northside Lions Club.



TDOOR OUTDOOR OUTDOOR OUT OKS BOOKS BOOKS BOOKS BOOK

Crown Publishers, Inc. (419 Park Ave. S., New York 10016) have added to their Sportsmen's Classics series the first book on turkey hunting in over 20 years. "MODERN TURKEY HUNTING by Jim Brady is a primer and complete general reference for the veteran turkey hunter as well as the novice. It's a must for every hunter's bookshelf," says Ed Murphy of *Sports Afield*.

Although many naturalists at the beginning of the century predicted that the American wild turkey would be



extinct by this time, the bird and turkey hunting are making a phenomenal comeback today. Brady describes the full life cycle of the turkey, reconstructs its natural history and habitat, and dramatizes its ecological success story. He passes on in detail his own experience in turkey hunting—calling, tracking, turkey guns and loads, clothing, and more—knowledge gathered from years in the field, from New York state to the Carolinas and in the company of some of the nation's most expert biologists, game managers, and turkey hunters. Guide to a fast-growing sport, the book sells for \$5.95.

THE CHESAPEAKE BAY IN MARYLAND—AN ATLAS OF NATURAL RESOURCES, edited and illustrated by Alice Jane Lippson for the Natural Resources Institute of the University of Maryland, Johns Hopkins Press, \$3.95 paperbound; \$8.95 in a casebound, jacketed edition.

The University of Maryland has done for Maryland what every state in the union should have done for itself—namely, make an inventory and compile a comprehensible, as well as comprehensive, catalog of natural resources in land or water. The Chesapeake is an especially rich estuary that is coming under increasing development pressure, and this handsome book arrives none too soon to help officials plan the Bay's future—or aid conservationists fighting officials who don't seem to understand the Bay's rich heritage and multiple uses of today and tomorrow. Indeed, the only failure of this volume is that it necessarily restricts itself to a study of Maryland waters, and, of course, the Bay and Delmarva Peninsula includes much more in the way of resource and watershed than what lies within the jurisdictional limits of Maryland. So many of the Bay's woes can be traced to meaningless administrative distinctions between what constitutes, say, Maryland waters and what constitutes Virginia, that it would have been nice to see an attempt to do a study of the entire region—a region on the brink of massive change and possible disaster.

In any event, with the publication of THE CHESAPEAKE BAY IN MARYLAND, the burden of proof has shifted to neighboring states—indeed, all other states—to initiate a similar catalog of resources. Without such vital information synthesized into some readable form, our regional "progress" and land use will continue to be the pell-mell affair it has been to date.

GWR
(Reprinted from the National Wildlife Federation's *Conservation News*)

VIRGINIA WILDLIFE

Know Your **WARDENS**

Text and Photos by F. N. SATTERLEE
Information Officer

Second Generation Warden

WOODROW W. NEWMAN
Game Warden, Smyth County

"Woody" Newman was born in Smyth County, Virginia, where his father, in addition to being a school teacher and farmer, was one of the Commonwealth's earliest Game Wardens. He was one of eleven children who grew up on the 120 acre farm located on Hutton Branch near Marion, Virginia, where his father bred and sold registered Percheron draft horses. While attending Marion High School, he played right guard on the football team and, following graduation, attended a special course in Animal Husbandry at Virginia Polytechnic Institute at Blacksburg, Virginia.

Mr. Newman became caretaker of the Commission's Fish Hatchery in 1928 and after two years returned to the farm to help his father in the horse business. Following that, he became, in 1936, a rural mail carrier on Route 1 and Route 3 in Smyth County. He became a Special Game Warden in 1939 and on December 1, 1943, was accepted as a full time warden assigned to Smyth County. At that time one of his more important duties was the control of dogs, especially those that were harassing livestock.

On January 1, 1974, Woody retired from the Game Commission on a disability, which he emphasizes was of necessity and certainly not by choice, and he will continue to live on the farm on Hutton Branch. To him the most satisfying aspect of his work as a warden was being with good people and in the outdoors with the hunters and fishermen.

Mr. Newman's wife, now deceased, was the former Lucille Octavia Etter from Wythe County, Virginia. The couple had two children, a son, Ralph Newman, II of Springfield, Virginia, and Carolyn, who lives in Marion.



Early photo of Woody Newman's parents, Mr. and Mrs. A. M. Newman. Newman senior was one of the pioneer Game Wardens in the Commonwealth, having begun in that capacity in 1918.





Edited by JIM KERRICK

CORRECT PROP DELIVERS TOP PERFORMANCE

The search for the right propeller can be a frustrating experience. As one man complained, "I can't get a straight answer from anyone!"

The people dodging this man's questions were actually doing him a favor. There just aren't any simple formulas. A shakedown cruise is absolutely necessary. Sometimes the boatman might have to make a dozen test runs.

A propeller converts energy, or the torque of the turning crankshaft, into forward thrust. The wrong propeller can upset this power balance and result in poor performance or serious engine damage.

Manufacturers equip outboards with a "standard" propeller. It is designed to allow the engine to run at its rated r.p.m. and horsepower, at full throttle on an *average* boat with an *average* load. With the wide variety of boats on the market and the many boat-engine combinations, it's obvious that this standard prop may not fill the bill in many cases. In fact, on many installations the standard propeller should be changed before the first run.

Propeller selection charts can make the search a lot easier. These charts are also based on the average boat with an average load. Unusual hull designs or load conditions may make it necessary to make a further change after the initial test run.

Before starting out, make sure your outboard is properly tuned. You'll also need a tachometer to check the r.p.m.'s produced by the engine.

Proper transom height is also necessary if you expect to obtain accurate information. If the transom is too high, propeller slippage (cavitation) may result. If the transom is too low, the lower unit will produce excessive drag. The normal transom height is 15 inches.

The vertical angle of the lower unit

affects over-all performance. The correct angle can only be determined by observing how the boat operates at full speed. A planing type hull should ride with the bow slightly out of the water. If the boat porpoises, the lower unit is too far out. A bow that digs into the water means the lower unit is too far in.

Start out with the propeller recommended on the selection chart. Load all the equipment aboard that you expect to carry this summer. Make sure it is properly distributed. Your engine was built to operate at full throttle, so do all your checking and recording at this speed.

Your owner's manual lists the cor-

rect r.p.m. range for your engine. At full throttle check the tachometer to see if the r.p.m. reading corresponds with your manual's recommendations.

If the reading exceeds the maximum, you need a propeller with more pitch.

An engine turning less than the minimum r.p.m.'s needs a propeller with less pitch. In this case, the blades are taking too big a bite into the water.

Water-ski enthusiasts have a special problem. The right prop for cruising often won't deliver the necessary initial thrust to pull skiers to the surface.

You can sidestep the extra expense of two propellers by selecting just a good ski prop.





The bald eagle has been the official symbol of our country since George Washington took the oath of office in 1789. Today, it may well stand as a symbol for the destruction we have since wrought upon the natural environment. For the demise of the bald eagle, at least over much of its eastern range, epitomizes the plight of countless less spectacular, less celebrated wildlife species.

The eagle has fallen victim to some of the very things it has symbolized: the aggressive growth and development of modern America. The landscape has been altered, erased and poisoned, almost at will, and at an ever accelerating pace. Even now, while we are compiling lists of "endangered species," the destruction and pollution of natural areas continues.

Until the early sixties, the decline of the bald eagle in the Chesapeake Bay region had coincided roughly with the increase in the human population and the corresponding loss of wildlife habitat. When nesting sites were encroached upon by subdivisions, marinas, motels and shopping centers, the birds did not always seek new homes. Instead, they made aborted attempts to breed or else did not nest at all. Highly susceptible to human disturbance, they often laid eggs, then abandoned or neglected them. From 1936, when an incomplete, one man census estimated 200 nesting pairs, active nests in the Bay area had dwindled to a carefully counted 70 in 1965.

FEBRUARY, 1974

The Southern

BALD EAGLE

By JOHN W. TAYLOR
Edgewater, Maryland

Then another, far more critical situation developed. There began a pattern of unsuccessful mating and nesting, evidenced by a high percentage of infertile eggs. The 1966 nest survey revealed that an estimated 60 pairs of eagles produced only three eaglets.

Chemical analyses of unhatched eggs and of tissues from dead eagles eventually solved the riddle and identified the cause: pesticide poisoning. The birds had ingested sufficient poison (chlorinated hydrocarbons) to render them incapable of laying eggs of normal thickness. (Very small amounts of DDT in a system are enough to interfere with the production of calcium.) Eagles are especially vulnerable to such poisoning. Chemical residues accumulate in rivers and estuaries, where they pass along the food chain and are soon concentrated in the higher organisms. And dead and weakened fish are the primary food of the bald eagle.

In many cases, the poisons resulted in direct mortality. An adult eagle, deathly sick and trembling, was found under a nest tree on Jamestown Island. Later it died, and the body was sent to the Patuxent Wildlife Research Center in Maryland for autopsy, where it was found to have DDT residues ranging from 6.9 parts per million (ppm) in the brain, to 34.3 ppm in the heart. (1 ppm is enough to cause malfunctions in the organs of rats.)

The ban on the use of DDT may have come in time. The 1973 nesting season produced more eaglets since the comprehensive survey began in 1962. (Still, of 66 nests with adult birds attending, only 24 contained eggs which hatched.) Too, there are signs that some eagles are adjusting to human activity.

So there is possibly time yet to save the eagles of the Chesapeake. It will require a determined effort on the part of private citizens as well as government officials. The first priority is the preservation of natural areas large enough for the birds to nest unmolested. Known eyries should be guarded from interference of any sort. And there remains the danger of wanton shooting, especially of immature birds which lack the white head and tail and are not easily recognizable.

Anyone in Virginia who knows of an eagle nest, or who makes observations of special interest, should contact Jackson M. Abbott, 8501 Doter Drive, Alexandria, coordinator of the Chesapeake eagle survey.

POISONOUS SNAKES

and their look-alikes

ILLUSTRATED BY DUANE RAVER

POISONOUS SPECIES

BLACK PHASE



TIMBER RATTLESNAKE



YELLOW PHASE

CANEBRAKE RATTLESNAKE



ADULT



YOUNG

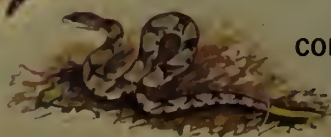


COTTONMOUTH

ADULT



YOUNG



COPPERHEAD

NON-POISONOUS SPECIES



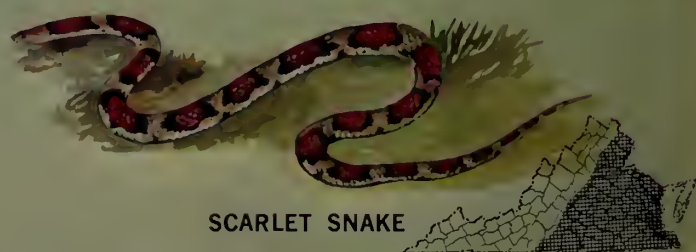
EASTERN MILK SNAKE



COASTAL PLAIN MILK SNAKE



SCARLET KING SNAKE



SCARLET SNAKE

BROWN WATER SNAKE



NORTHERN WATER SNAKE



EASTERN HOGNOSED SNAKE

